

CLAIMS

- 1           1.     An electrically conductive multilayer composite comprising:  
2               first and second polymeric films, each of said films being flexible and having upper and  
3               lower surfaces, said second film being thermoformable at temperatures at and above its glass  
4               transition temperature;  
5               a flexible electrically conductive layer applied to the upper surface of said first film;  
6               and  
7               an adhesive interlayer adhering the lower surface of said first film to the upper surface  
8               of said second film, said adhesive interlayer having elastic properties sufficient to  
9               accommodate relative movement between the thus adhered films occasioned by flexure of said  
10              composite.
- 1           2.     The composite of claim 1 wherein said second film is resilient.
- 1           3.     The composite of claim 2 wherein said adhesive interlayer has elastic properties  
2               at temperatures between about -50 to 150°C.
- 1       NS 4.     The composite of claims 1 or 2 wherein said electrically conductive layer  
2               comprises a metallic foil adhered to the upper surface of said first film by means of a second  
3               adhesive.
- 1           5.     The composite of claims 1 or 2 wherein said adhesive interlayer is pressure  
2               sensitive.

6. The composite of claim 2 wherein said second film has a higher bulk modulus of elasticity than that of said first film.

7. The composite of claims 1 or 2 further comprising a third flexible polymeric film adhered to the lower surface of said second film by a second adhesive interlayer.

Sub 1  
8. The composite of claims 2 or 7 further comprising a second flexible electrically conductive layer applied to the side of said composite opposite to that to which said first mentioned electrically conductive layer is applied.

9. The composite of claims 1 or 2 wherein said electrically conductive layer is selected from the group consisting of copper, aluminum, nickel, tin, silver, gold, ferrous metals and alloys thereof.

10. The composite of claims 1 or 2 wherein said electrically conductive layer has a thickness of not more than about 20 mil.

Sub B3  
11. The composite of claims 1 or 2 wherein the polymeric materials of said first and second films are selected from the group consisting of polyesters, polyamides, polyimides, polyurethanes, polyethylenesulfones, polybutenes, and derivatives, polycarbonates, polystyrene, (and copolymers containing styrene) polyethylene (linear), polyethyleneketones, polyacrylates (including methacrylates), rigid PVC (and copolymers).

12. The composite of claims 1 or 2 wherein said electrically conductive layer is interfacially fixed with respect to the upper surface of said first film.

1 13. A method of preparing an electrically conductive multilayer composite  
2 comprising:

3 a) providing first and second polymeric films, each of said films being flexible and  
4 having upper and lower surfaces, said second film being thermoformable at temperatures at  
5 and above its glass transition temperature;

6 b) applying a flexible electrically conductive layer to the upper surface of said first  
7 film; and

8 (c) adhering the lower surface of said first film to the upper surface of said second  
9 film by means of an adhesive interlayer that has elastic properties sufficient to accommodate  
10 relative movement between the thus adhered films occasioned by flexure of said composite.

1 14. A method of preparing a shaped electrically conductive component, said method  
2 comprising:

3 a) preparing a multilayer composite by:

4 (i) providing first and second polymeric films, each of said films being  
5 flexible and having upper and lower surfaces, with at least said second film being  
6 thermoformable at temperatures at and above its glass transition temperature;

7 (ii) applying a flexible electrically conductive layer to the upper surface of  
8 said first film; and

9 (iii) adhering the lower surface of said first film to the upper surface of said  
10 second film by means of an adhesive interlayer that has elastic properties sufficient to  
11 accommodate relative movement between the thus adhered films occasioned by flexure  
12 of said composite.

- 13           b)     heating said composite to an elevated temperature at least as high as the glass  
14 transition temperature of said second film;  
15           c)     shaping the thus heated composite into a selected shape; and  
16           d)     cooling the thus shaped composite to a temperature below said elevated  
17 temperature.

- 1   15.    The method of claims 13 or 14 wherein the second film is resilient.